



## Inside the Star

- Second Free flight test of X-40A successful, page 3
- Marshall to mark STS-1 anniversary, pages 4-5
- Astronauts present Silver Snoopy Awards, pages 6-9
- Marshall Payloads team builds pallet for STS-100, page 10
- NASA prepares for first hypersonic test flight, page 13
- *FIRST Robotics status report*, page 14



Photo by Terry Leibold, NASA/Marshall Space Flight Center

### ***Making the world a prettier place***

Cody Phillips, left, Clayton England, center, and Ryan Rutherford plant flowers for Earth Day at Marshall's Child Development Center. Earth Week activities at Marshall are being held through Friday. This year's theme is "2001: An Earth Odyssey." Besides environmental, recycling and energy displays in the lobby of Bldg. 4200, there will be a tree planting ceremony from 10-11 a.m. Thursday on the north side of Bldg. 4619.

## Marshall Center boosts Alabama economy with \$774 million in fiscal 2000 expenditures

by Jonathan Baggs

NASA's Marshall Center contributed \$774 million to Alabama's economy in fiscal year 2000. That contribution included \$238 million in salaries for civil service personnel and related costs, as well as travel. It also included \$536 million spent on locally procured services, prime contractor and subcontractor support, and local construction.

Approximately \$69 million in retirement annuities were paid in 2000 to 2,515 Marshall retirees residing in Alabama, with 1,604 retirees in Huntsville and Madison receiving \$44 million of that amount.

The \$774 million spent in Alabama was significantly more than the Marshall Center's expenditures in any other state. In addition, NASA funding of approximately \$128 million was

spent in North Alabama for International Space Station hardware development by The Boeing Company, while approximately \$57 million was spent on other NASA programs in which Marshall had a supporting role. An additional \$43 million was spent on programs where Marshall performed work for other agencies.

Marshall received approximately 16 percent — or \$2.2 billion — of NASA's total budget of \$13.6 billion during fiscal 2000. Of Marshall's allocation, 73 percent was spent for Human Exploration and Development of Space including Space Shuttle and International Space Station activities; 26 percent for Space Science, Earth Science, Aerospace Technology and Biological and Physical Research activities; and about 1 percent on Strategic Support of Marshall Center Programs.

*See Economy on page 11*



Kennedy

## Marshall Center deputy director keynote speaker for Public Service Recognition Week

**T**he Marshall Center will celebrate Public Service Recognition Week honoring federal, state and local government employees in Madison County May 7-11.

Throughout the nation and around the world, public employees use the week to educate citizens about the many ways in which government serves the people and how government services make life better

for all of us.

This year, a luncheon at noon May 9 at the Huntsville Marriott will feature keynote speaker James Kennedy, deputy director of the Marshall Center.

Tickets to the luncheon are \$17 each and may be purchased through admin officers through May 4.

## What to do if you identify a problem at Marshall

*from Marshall's Safety and Mission Assurance Office*

**T**here are many ways to report problems at Marshall. Identified below are specific types of problems and the appropriate action employees should take to resolve the problem.

### Marshall Management System (MMS) problems

Employees should try to resolve all Marshall Management System problems through the appropriate people who can bring resolution to the problem. If you do not know who to notify, or cannot get a resolution, you should initiate a Quality System Deficiency Notice (QSDN). To initiate a Quality System Deficiency Notice, go to "Inside Marshall" on the Web, select the "Corrective Actions" button, then "QSDN." Fill in the blanks as appropriate. A Quality System Deficiency Notice may be initiated for any deficiency or employee concern. Specifics are noted in MPG 1280.4.

### Flight hardware or software problems

For problems identified for flight hardware or software, employees should fill out Marshall Form 460 in accordance with MPG 8730.3.

### Program or project problems

For concerns with program or project issues, employees should notify the program or project manager. If a concern cannot be resolved after reasonable efforts have been made to resolve concerns through the program or project management, and if the concern cannot be resolved, any of the actions identified in this article, as appropriate, can be exercised.

If you wish to stay anonymous, you may report your concern in the NASA Safety Reporting System (NSRS). To initiate a NASA

Safety Reporting System report, go to "Inside Marshall," select the "Corrective Actions" button, then "NSRS." This will take you to the NSRS Web site. Follow the instructions on how to submit a NASA Safety Reporting System report.

### Safety Problems

- For emergencies such as ambulance, fire, security, chemical spills, dial 911
- For immediate attention safety issues, call the "Safety Hot Line" at 544-HELP (4357), then choose the "Safety" option.
- For non-emergency safety concerns, a Safety Concerns Reporting System (SCRS) should be initiated. To initiate a Safety Concerns Reporting System, go to "Inside Marshall," select the "Corrective Actions" button, then "SCRS." Fill in the blanks as appropriate. The Safety Concerns Reporting System can be done anonymously.
- For a facility safety issue or concern, dial 544-HELP (4357), and then choose the "Facilities Work Request" option. Specify that the request is for a safety concern.
- For safety issues such as water spills or leaks on floor, stay in the area until help can be obtained to prevent others from being put in danger.

Each employee should be knowledgeable of their responsibilities to report safety concerns and issues to their supervisor and/or building manager, as appropriate, in accordance with MPG 8715.1.

Efforts should always be made with the appropriate people who can bring resolution to an identified problem. This helps to avoid extra efforts that may not be necessary if the problems can be resolved in a timely manner.

If at any time you are not sure what to do about identifying and resolving problems, you should acquire help through your normal management chain of command.

## Live from the North Pole

**N**ASA will provide a live, interactive Web cast from the floating sheets of ice, when the first, all-woman team to ski from Russia arrives at the exact North Pole.

The NASA team and Dr. Kathryn Clark, chief scientist for NASA's Human Exploration and Development of Space Enterprise, will conduct a live video Web cast from the North Pole to mark the completion of their historic trek.

Clark's interview with the WomenQuest team is scheduled to be Web cast between 3-5 p.m. April 24 at: <http://www.nasa.gov/women/welcome.html>.

The all-woman Polar Trek team will have traveled more than 150 miles on skis, in sub-zero conditions to the top of the planet at True North.

## NASA selects 27 innovative small business projects

*NASA release*

**N**ASA has selected 27 research proposals for negotiation of Phase 2 contract awards for its Small Business Innovation Research (SBIR) Program. Twenty-five small, high technology firms located in 13 states will conduct the selected projects, which have a total value of approximately \$16 million.

The goals of this NASA program are to stimulate technological innovation, increase the use of small business, including women-owned and disadvantaged firms in meeting federal research and development needs, and increase private-sector commercialization of innovations derived from federally funded research.

SBIR contractors completing Phase I projects submitted a total of 267 proposals. These proposals were evaluated to determine that they met SBIR Phase I

objectives and are feasible research innovations for meeting agency needs. The new selections are in addition to 110 proposals selected last year.

Phase 2 continues development of the most promising Phase I projects. Selection criteria include technical merit and innovation, Phase I results, value to NASA, commercial potential and company capabilities. Funding for Phase 2 contracts could be up to \$600,000 for a two-year performance period.

The NASA SBIR Program Management Office is located at the Goddard Space Flight Center, Greenbelt, Md., with executive oversight by NASA's Office of Aerospace Technology, NASA Headquarters, Washington, D.C. Individual SBIR projects are managed by NASA's 10 field centers.

A list of the selected companies is available on the Internet at: <http://sbir.nasa.gov>

## Paving the way for NASA's X-37 space plane

## X-40A second free flight successful; third flight planned

**T**he X-40A vehicle successfully performed a second free flight test April 12 at Dryden Flight Research Center at Edwards, Calif. A third free flight test was planned for Saturday.

The X-40A was lifted by an Army Chinook helicopter to an altitude of 15,050 feet (4,587 meters) and released at 8:45 a.m. PDT, reaching a speed of 428 feet (130.5 meters) per second to complete the test when the wheels rolled to a stop at 8:47 a.m. PDT.

The X-40A's free flight and landing tests are being conducted as part of NASA's X-37 program, intended to reduce the risk of flight testing the X-37 experimental re-entry vehicle. The X-37 will enable NASA to test advanced technologies in the harsh environment of space and in returning through Earth's atmosphere. The X-40A is an 85 percent scale version of the X-37.

Last Thursday's X-40A test objectives focused on complex vehicle maneuvers, while the first free flight test on March 14 focused on a straight-in vehicle approach. Both tests demonstrated flight control and autonomous landing systems. A series of up to seven free flights is planned.

The Marshall Center is NASA's lead center for space trans-

portation systems development, manages the X-37 program. Dryden Flight Research Center is responsible for the X-37/X-40A flight test activities.



The X-40A touches down at Dryden following its successful second free flight test.

# Young, Crippen join Marshall team to celebrate

**M**arshall team members will have the chance Tuesday to mingle with the first astronauts that traveled into space on the Space Shuttle.

That's when STS-1 Commander John Young and Pilot Robert Crippen will join Marshall employees, on-site contractors and retirees for a celebration to mark the 20<sup>th</sup> anniversary of the first Space Shuttle launch.

The celebration will be held from 10 a.m. to 11 a.m. in the North Structure of Bldg. 4752. Lunch will follow in the Marshall Center picnic area. Friday is the last day to purchase tickets for the picnic lunch. Tickets are \$3.50 each, for a choice of barbecue sandwich or garden salad. The meal includes chips,

a drink and an opportunity to enjoy a slice of STS-1 celebration cake. Tickets are available through administrative officers or at the NASA Exchange in Bldg. 4752.

There is no charge to attend the events in the North Structure Bldg. 4752.

To kickoff the celebration, Center Director Art Stephenson and Marshall Shuttle Projects Office Manager Alex McCool will invite Young and Crippen to share their STS-1 recollections. In addition, the astronauts will participate in a ceremony to cast their footprints as part of Marshall's "Footprints to the Future" collection and place their signatures on a plaque that will be attached to a Space Shuttle Main Engine that later will be placed on permanent display at the Center. Stephenson will also share his perspective on the significance of the anniversary.

Those who purchase a lunch ticket and sign their name on the back of the ticket will also be eligible to win a door prize. As part of the drawing, ticket holders will have opportunities to win, among other prizes, a copy of the recently published history of the Marshall Center entitled "Power to Explore, A History of the Marshall Space Flight Center, 1960-1990."

Everyone who attends the ceremony in the North Structure will also receive an STS-1 crew lithograph featuring the signatures of Young and Crippen. They will also receive a copy of a brand new 20-page history booklet entitled, "Toward Liftoff." The booklet focuses on the Marshall Center role in developing the propulsion elements for STS-1.

A new mode of space travel was ushered in when the Space Shuttle Columbia left the launch pad at Kennedy Space Center on April 12, 1981. It was the first American crewed space flight in nearly six years. A craft unlike anything America had launched before, the first Shuttle, like all other Shuttle missions since then, was powered by propulsion elements provided by the Marshall Center. These elements included the Space Shuttle Main Engines, the Solid Rocket Boosters and the External Tank.

Primary mission objectives of the maiden flight were to check out the overall Shuttle system, accomplish a safe ascent into orbit and to return to Earth for a safe landing. All of these objectives were met successfully and the Shuttle's worthiness as a space vehicle was verified.

The only payload carried on the mission was a Development Flight Instrumentation package that contained sensors and measuring devices to record orbiter performance and the stresses that occurred during launch, ascent, orbital flight, descent and landing.

The 36-orbit, 933,757-mile-long flight lasted 2 days, 6 hours, 20 minutes and 32 seconds. The landing took place on Runway 23 at Edwards Air Force Base in California on April 14, 1981, at 10:21 a.m. PST.

## Transportation will be provided to and from Bldg. 4752

**B**us transportation will be provided to Bldg. 4752 north structure from 9:15-10 a.m. A second bus run will begin at 10:30. Buses will return employees to their buildings between 11:15 a.m. and 1 p.m.

- **Stop 1**

Bldg. 4200, west side (main loop)

- **Stop 2**

Bldg. 4203, north loop

- **Stop 3**

Bldg. 4250, east end

Bldg. 4207, northeast

- **Stop 4**

Bldg. 4705, south side

Bldg. 4708, northwest

Bldg. 4707, north side

- **Stop 5**

Bldg. 4493, west end of Bldg. 4483

Bldg. 4481, west end

Bldg. 4471, east end

- **Stop 6**

Bldg. 4612, west side

Bldg. 4610, north side

- **Stop 7**

Bldg. 4487, main (south side)

- **Stop 8**

Bldg. 4663, main (north side)

Bldg. 4650, east side

- **Stop 9**

Bldg. 4666, main

BAC49, south side (parking lot entrance)

# Marshall retiree remembers first Shuttle launch

by Debra Valine

**A**s NASA and the Marshall Center celebrate the launch of the first Space Shuttle, Marshall retiree Dr. Michael Susko remembers what it was like to stand on Astronaut Hill, waiting for STS-1 to launch on April 12, 1981.

Susko, a former aerospace engineer in Marshall's Space Sciences Laboratory, used electrets — sensors — to measure environmental contaminants from the Shuttle launch and wind speeds on the first four Shuttle flights.

He gained this knowledge while working as a weatherman both with the 20<sup>th</sup> Weather Squadron of the Far East Air Force of the U.S. Army Air Corps in the Philippines during World War II and as a civilian working for the Air Force at Eglin Air Force Base in Florida.

The electrets picked up the specific environmental effects. In the case of contaminants, the sensors identified the type and amount. The information was then evaluated by X-ray spectroscopy for the contamination rate.

For the first launch, the electrets were

not part of the payload because of the nearly 2,000 pounds of extra weight that would have been added. The electrets did fly on STS 2-4.

"We needed that information in case the Shuttle needed to turn around after launch," Susko said. "Turning around if a problem was detected would have been much harder with that added weight. We had to measure the contaminants for the first four Shuttle launches to make sure we met Environmental Protection Agency guidelines."

"There may have been thousands of people there to watch that first launch," Susko said. "Once we got out to the launch site, we had to stay there all night."

Susko, originally from Monessen, Pa., also was present at launch pad 43A for the launch of the Titan III Mission to Mars.

"We used the electrets in Salt Lake City, Utah, at the demonstration models,

## *Weather Squadrons to hold reunion in Huntsville*

**T**he 15<sup>th</sup> and 20<sup>th</sup> Weather Squadron veterans are having a reunion May 9-12 in Huntsville.

The weather squadrons were assigned to the South Pacific during World War II.

Marshall retiree Dr. Mike Susko, co-chair of the reunion, used his meteorological training to gather information that was used in the dropping of the atomic bombs on Hiroshima and Nagasaki.

Twenty-five veterans and their wives will visit the Marshall Center and the U.S. Space & Rocket Center.

and also for the Mission to Mars. I was at the Saturn V launch, too — 1.5 miles away to measure the winds."

Susko retired from Marshall in 1994 after 47 years in government service. He was attending college at California State College in California, Pa., and working at a steel mill when he joined the Army Air Corps in 1943 as a weatherman.

"My whole career has been in weather," Susko said. He was stationed in the Philippines with the 20<sup>th</sup> Weather Squadron when the United States dropped the atomic bombs at Hiroshima and Nagasaki. "We helped calculate wind speed and direction for that drop, so we knew the thing was going off."

He went back to college after he left the military and then went to Eglin. He received a bachelor's degree in math and science from Duquesne University in Pittsburgh, Pa., a master's from the University of Tennessee at Tullahoma, and a doctorate from the Southeast Institute of Technology in Huntsville.

Susko is a charter member and associate fellow in the American Institute of Aeronautics and Astronautics.

*The writer, employed by ASRI, is the Marshall Star editor.*



Photo by Dennis Olive, NASA/Marshall Space Flight Center

Susko shares memorabilia from his 47-year government service career.

# STS-98 astronauts distribute Silver Snoopy Awards

**D**uring their visit to the Marshall Center Friday, STS-98 astronauts presented Silver Snoopy Awards to Marshall employees and contractors for their contributions to the Space program.

Receiving Silver Snoopy Awards from STS-98 Commander Kenneth Cockrell Friday are, from left, Roger K. Baird, ED15; James E. Sledd, ED42; Karen Cunningham, ED11; STS-98 Commander Kenneth Cockrell; Jody Minor, ED03; Bill Blackwell, Sverdrup; Patrick McManua, ED16; Cynthia Russell, Raytheon; and Thomas Dematteis, ED19.



Photos by Dennis Olive, NASA/Marshall Space Flight Center



Andrew N. Hooten of Hernandez Engineering, left, receives a Silver Snoopy Award from STS-98 Commander Kenneth Cockrell.



Jared Smith of Sverdrup, right, receives a Silver Snoopy Award from STS-98 Commander Kenneth Cockrell.



Danny Woodard, SD13, left, receives a Silver Snoopy Award from astronaut Robert Curbeam, a mission specialist on STS-98.



Bobby Thompson, TD12, left, receives a Silver Snoopy Award from astronaut Robert Curbeam, a mission specialist on STS-98.



**John McCord of The Boeing Company, third from right, receives his Silver Snoopy Award from STS-98 astronauts, from left, Mission Specialist Tom Jones, Commander Kenneth Cockrell; Pilot Mark Polansky; and Mission Specialist Robert Curbeam.**

Photo by Dennis Olive, NASA/Marshall Space Flight Center



Photos by Adeline Byford, NASA/Marshall Space Flight Center

**Patrick Hart of New Technology Inc., left, receives his Silver Snoopy Award from Mission Specialist Robert Curbeam.**



**Ralph Elmore of New Technology Inc., left, receives his Silver Snoopy Award from Mission Specialist Robert Curbeam.**



Photos by Terry Leibold, NASA/Marshall Space Flight Center

**Phillip Barber of Thiokol, left, receives his Silver Snoopy Award from STS-98 Pilot Mark Polansky.**



**Michael Prince, ED34, left, and Steve Whitfield, ED36, right, receive Silver Snoopy Awards from STS-98 Pilot Mark Polansky.**

# Silver Snoopy Awards

Continued from page 7



STS-98 Pilot Mark Polansky, center, presents Silver Snoopy Awards to Computer Sciences Corp. employees from left, Walter Franklin; Lisa Nayman; Walter Lindblom; Sandra George; Brent Siota; and James Glen.

Photos by Terry Leibold, NASA/Marshall Space Flight Center



From left, Katherine Mims, ED21; Tim Thornton, Ai Signal Research Inc.; and John Gibson, ED24, receive Silver Snoopy Awards from STS-98 Pilot Mark Polansky, second from right.



Photos by Jeff Wolfe, NASA/Marshall Space Flight Center

Judy Green, left, CD01, and Benita Hayes, CD30, right, receive Silver Snoopy Awards from Mission Specialist Tom Jones.



Mission Specialist Tom Jones, second from right, presents Silver Snoopy Awards to, from left, Patrick Meyer, AD34; Marcellus Graham, AD33; and Andrew Welch, AD42.



From left, Marty Hanson, PS20; Ketela White, PS40; and Becky Carne, PS 40, receive Silver Snoopy Awards from Mission Specialist Tom Jones, second from left.



Mission Specialist Tom Jones, third from left, presents Silver Snoopy Awards to, from left, Eugene Damon, Mary Bell, Wallace Davis, James Martin, and Rodney Gilbert, all of Teledyne Brown.



Photo by Dennis Olive, NASA/Marshall Space Flight Center

### ***NASA 'Goes to the Stars'***

STS-98 Commander, Ken Cockrell, center, gets last-minute pointers on throwing out the first pitch from Huntsville Stars Manager Jim McCall, right. Mission Specialist Tom Jones looks on. Cockrell threw out the first pitch opening night April 7 to open the Huntsville Stars baseball season. The NASA Exchange and Marshall's Customer and Employee Relations Directorate sponsored the game and provided free tickets to Marshall employees and contractors.

# Marshall Center builds pallet carrying Canada's robotic arm to International Space Station

by Debra Valine

**T**he primary payload on STS-100 set to launch Thursday from Kennedy Space Center in Florida is the Canadian robotic arm. It's Marshall's job to get the robotic arm safely to the International Space Station.

Jerry Maxwell, who is in Marshall's Flight Projects Directorate, is the project manager for this Spacelab pallet mission. His Spacelab pallet team, the Payload Carriers Team, is part of the Payload Carriers Office, responsible for the analytical integration of the cargo to the pallet.

The Canadian arm was shipped directly to Kennedy Space Center in Florida from The Canadian Space Agency, where it was physically integrated into the unpressurized carrier. It was placed on the launch support assembly — a table-like structure — which was built at Marshall. Marshall provided the Spacelab pallet itself, and built various components such as:

- bolt stowage assembly
- cargo adapters — including the Launch Support Assembly -the mounting adapter and support structure for the Space Station Remote Manipulator System (SSRMS) or Canadian Robotic Arm — officially called Canada Arm 2
- Rigid Umbilical Adapter
- UHF Antenna and Deployment Assembly adapter
- Laboratory Cradle Assembly adapter

Marshall also built mission-support hardware adapters: Space Transportation System Remote Manipulator System Flight Releasable Grapple Fixture adapters; extra vehicular activities aids adapters; and Modules to Truss Structure Attach System — Passive

(MTSAS-P) Assembly adapter. Boeing Company in Huntington Beach, Calif., built the MTSAS-P and the Ultra High Frequency antenna.

Marshall conducted the neutral buoyancy tests on the robotic arm at the Marshall Center in 1995 during the government shutdown. Model and static testing was performed in Bldg. 4619.

Besides the pallet carrying the Space Station Remote Manipulator System, this launch includes a host of Marshall-related payloads including the Raffaello Multi-Purpose Logistics Module; the Ultra High Frequency antenna; EXPRESS racks; the Payload Equipment Restraint System; and three commercial research experiments managed by Marshall.

Marshall also manages the propulsion elements that will power Endeavour on its 11-day mission.

"We have 20 years of experience with the Spacelab pallet, but this will be the first time the Spacelab pallet will be removed from the bay. Once removed, it will then be attached to the International Space Station," Maxwell said. "Once the Canadian arm is deployed, the arm will hook back up to the pallet and 'wave' the pallet around to make sure the arm works properly. It will then attach the pallet to the Shuttle Arm. The Canadian arm will let go of the pallet, and the Shuttle arm will put the pallet back into the cargo bay.

"Skip Hatfield, the program manager for robotics at Johnson Space Center in Houston said, 'The Marshall Center saved the Space Station Program time and money by having the work done at Marshall,'" Maxwell said.

*The writer, employed by ASRI, is the Marshall Star editor.*

## What to do to ensure thunderstorms, lightning safety

from Marshall's Safety Office

**W**ith the arrival of Spring, residents of Northern Alabama can expect volatile weather, particularly thunderstorms.

### Before the storm

- Know the county in which you live and the names of nearby major cities. Severe weather warnings are issued on a county basis.
- Check the weather forecast before leaving for extended periods outdoors.
- If a storm is approaching, keep a NOAA Weather Radio or AM/FM radio with you.
- Postpone outdoor activities if thunderstorms are imminent.
- Check on those who have trouble

taking shelter if severe weather threatens.

### When thunderstorms approach

- If you can hear thunder, you are close enough to the storm to be struck by lightning. Go to safe shelter immediately.
- Move to a sturdy building or car. Do not take shelter in small sheds, under isolated trees or in convertible automobiles.
- If lightning is occurring and a sturdy shelter is not available, get inside a hard top automobile and keep the windows up.
- Get out of boats and away from water.
- Telephone lines and metal pipes can conduct electricity. Unplug appliances not necessary for obtaining weather information. Avoid using the telephone or any electrical appliances.
- Do not take a bath or shower.

- Turn off air conditioners. Power surges from lightning can overload the compressors.

- Get to higher ground if flooding is possible. Once flooding begins, abandon cars and climb to higher ground.

### If caught outdoors

- Find a low spot away from trees, fences and poles. Make sure the place you pick is not subject to flooding.
- If you are in the woods, take shelter under the shorter trees.
- If you feel your skin tingle or your hair stand on end, squat low to the ground on the balls of your feet. Place your hands on your knees with your head between them. Make yourself the smallest target possible, and minimize your contact with the ground.



Photo by Emmett Given, NASA/Marshall Space Flight Center

## Native American elders visit Marshall

Jim Carter, right, deputy director of the Center Operations Directorate, welcomes Gene Gold, left, vice chief of the Blue Clan Echota Cherokee Tribe of Alabama, and Millard Shelton, chief of the Blue Clan Echota Cherokee Tribe of Alabama, to the Marshall Center Monday. Billie Swinford of Marshall's Equal Opportunity Office looks on.

## Economy

*Continued from page 1*

Since it was established in 1960, the Marshall Center has had budget responsibility for more than \$67 billion. When yearly figures are adjusted for inflation, this total is equivalent to more than \$167 billion in today's dollar value.

The Marshall Center has paid approximately \$5 billion in federal salaries since its creation in 1960 through September. In 2000, Marshall civil service employees collectively paid more than \$185 million in federal income taxes and more than \$6 million in Alabama state income taxes.

At the end of September, Marshall's permanent and temporary civil service employees totaled 2,676, including employees at resident offices at prime contractor facilities and at NASA's Michoud Assembly Facility near New Orleans, La.

Of that workforce, 2,195 were college graduates, with 1,450 holding bachelor's degrees. There were 165 employees with doctorate degrees and 580 with master's degrees in fields of engineering, science –

predominantly mathematics and physics – as well as other disciplines, predominantly business administration.

During 2000, 23,649 contractor employees were involved in Marshall work, including 2,800 in mission support, 10,502 on prime contract work and 10,347 as subcontractors and vendors. Of the total, 6,980 worked in Alabama. Additionally, 763 contractors were associated with International Space Station work being done by Boeing in Huntsville and 730 with other NASA work supported by Marshall.

During fiscal 2000, 305,079 people toured Marshall, including educators, conference and symposium visitors and news media. Of these, 203,223 toured the Marshall Center as part of the U.S. Space & Rocket Center's bus tour program. The Space & Rocket Center in Huntsville is Marshall's official NASA visitor center.

In 2000, more than 48,194 students and 26,587 teachers and faculty representing all 50 states were reached through the

operation of Marshall's education programs. The Marshall Center donated \$1 million in research equipment and placed some \$189 million in grants, contracts and cooperative agreements through the education programs.

Another way the Marshall Center gives back to the community is through monthly Red Cross Blood Drives. In fiscal 2000, 828 pints of blood were collected from civil service and on-site contractors. Marshall civil service employees also contributed \$505,268 to the Combined Federal Campaign. Of this amount, \$288,288 was designated to help agencies in Alabama.

The Marshall Center celebrated 40 years of operation in 2000. Marshall looks to the future with dedication to continue its role as a vital contributor to America's future in space, while positively impacting the local, state and federal economy.

*The writer, employed by ASRI, supports the Media Relations Department.*

## ***NASA CONNECT named best K-12 distance learning program***

**T**he U.S. Distance Learning Association (USDLA) has voted the 2000-2001 NASA CONNECT series the best K-12 distance learning program in the United States for 2001.

This award recognizes organizations that have designed and delivered an outstanding and comprehensive distance learning program service.

Members of the NASA CONNECT team will accept the award April 19 at the e-Learning Conference and Expo in Washington, D.C.

The first place award was achieved despite intense competition and was based on the five programs in the 2000-2001 NASA CONNECT series. "Patterns, Functions, and Algebra: Wired for Space," the third program in the 2000-2001 NASA CONNECT season, was produced by the Marshall Space Flight Center with support provided by the Space Transportation Directorate, Education Programs Department and Marshall TV video services.

About 163,000 educators, representing more than 8 million students, are registered for NASA CONNECT.

## **Web site teaches effective stress management**

**R**esearch has documented that stress has an impact on every aspect of physical and mental health. While it is not likely that anyone can completely avoid work-related and personal stressors, we can improve our coping skills.

The NASA Employee Assistance Program has developed a voluntary, anonymous, easy to use Web-accessible training module that provides valuable information for employees on coping with everyday work and life pressures.

One component of this module is an anonymous questionnaire that will rank your stress index, identify stressors specific to your life and provide immediate feedback on stress management skills that are valuable in everyday situations.

This module also contains general information on stress, the uniqueness of the NASA mission, information on specific stressors and related coping skills, and lists of additional articles, recommended reading, and on-line resources. This site will link employees who want more information back to their respective Center's Employee Assistance Program officer and can be found at:  
<http://ohp.nasa.gov>



Photo by Doug Stoffer, NASA/Marshall Space Flight Center

### ***Robert Hughes receives Space Flight Awareness Leadership Award***

Robert W. Hughes, manager of Marshall's Development Projects Office, center, receives the NASA and Marshall Space Flight Center Leadership Award at the Washington, D.C., celebration of the 20th anniversary of STS-1 Space Shuttle First Flight. Marshall Center Director Art Stephenson, left, presented the award. Astronaut Doug Wheelock, right, looks on.

# NASA prepares for first scramjet-powered hypersonic flight

*NASA release*

Imagine a new breed of space transportation vehicle, able to fly at seven times the speed of sound, using a next-generation air-breathing jet engine. NASA takes a hypersonic leap into the future of aerospace technology with the flight of the scramjet-powered X-43A.

It will be the first time a non-rocket propelled, air-breathing engine has powered a vehicle in flight at hypersonic speeds, or five times the speed of sound. An aircraft moving at Mach 5 would travel about one mile per second, or about 3,600 mph at sea level, far faster than any air-breathing aircraft has ever flown.

Unlike a rocket that carries its own oxygen for combustion, the X-43A's scramjet scoops air from the atmosphere, making the aircraft lighter, which enables it to carry heavier payloads. The hydrogen-fueled aircraft has a wingspan of approximately 5 feet, measures 12 feet long and weighs about 2,800 pounds.

The first unpiloted X-43A and its Pegasus booster rocket will be air-launched from a B-52 from NASA's Dryden Flight Research Center, Edwards, Calif. The booster will accelerate the X-43A to Mach 7 at approximately 95,000 feet. At booster burnout, the X-43A will separate and fly under its own power on a preprogrammed flight path.

The NASA Hyper-X Program's development and flight testing of the X-43A vehicle is conducted jointly by Dryden and NASA's Langley Research Center, Hampton, VA. "The Hyper-X Program and the X-43A Flight Project

have forged a very fruitful partnership and national asset," said Joel Sitz, Dryden's X-43A project manager. "What the country is witnessing is the re-birth of hypersonics."

Sitz added, "After a successful X-43A mission, the 'brain trust' will exist to move forward with future propulsion-research vehicles that will ultimately result in more efficient space access vehicles."

"The Hyper-X program takes what we've been doing for the last 40 years in wind tunnel research to flight. Flight is reality," said Vince Rausch, Hyper-X program manager at Langley. "The program is structured around the scramjet engine and should be a major leap forward in the national capability for access to space. The country is looking for safer, more flexible, less expensive ways to get to space, and that's what the scramjet engine would bring us."

Scramjet technology could also allow more traditional aircraft-like operations of launch vehicles, with horizontal take-off, landing and servicing, which could greatly reduce operational cost and time between flights.

Three X-43A flights are planned; the first two will fly at Mach 7 and the third at Mach 10. Valuable performance data will be relayed electronically to Dryden and Langley. Each experimental aircraft will fly once in the Naval Air Warfare Center Weapons Division Sea Range off the southern coast of California and impact into the Pacific Ocean.

Like the comparatively slower ramjet counterpart, the scramjet has a simple

mechanical design with no moving parts. However, scramjet combustion occurs at supersonic air speeds in the engine. Rather than using a rotating compressor like a turbojet engine, the forward velocity and vehicle aerodynamic design compress air into the engine. There, fuel, usually hydrogen, is injected and the expanding hot gases from combustion accelerate the exhaust air and create thrust. In the case of X-43A, the thrust will propel the vehicle at hypersonic speeds up to Mach 10.

The first free-flight test will be approximately three weeks after an upcoming captive-carry flight, where the B-52 flies with the X-43A "stack" to the test range for a series of flight systems tests.

Following the first series of X-43A hypersonic flights, the next step is an expanded hypersonics research ground and flight program currently in place as part of the Advanced Space Transportation Program, which is led by the Marshall Center.

The vehicle contractor team, led by MicroCraft in Tullahoma, Tenn., includes The Boeing Company, Seal Beach, Calif., and GASL, Inc., Ronkonkoma, N.Y. The booster is a modified Pegasus rocket from Orbital Sciences Corp., Chandler, Ariz.

Additional information is available on the Internet at:

<http://www.dfrc.nasa.gov/Projects/hyperx/x43.html>

<http://www.dfrc.nasa.gov/Projects/HyperX/index.html>

## Redstone celebrates Mayfest, May 5

Redstone Arsenal will hold Mayfest at 11 a.m. May 5 at the Soldatenstube German Restaurant in Bldg. 3512. The event is free, and open to the public. It features German food and drinks, the Cahaba Clowns, an antique car show, a May Pole celebration for the children and a live German Band.

To get there, take Patton Road south, and follow the signs. Food, drinks, and memorabilia are available for a fee.

A Volksmarch — or People's Walk — starts at 8 a.m. May 5.

There will be a 10-kilometer (6.2 miles) difficult walk up Weeden Mountain on the Arsenal, as well as a 5 kilometer (3.1 miles) moderately easy walk which follows the foot of Madkin Mountain. A 5-kilometer easy walk is also available for wheelchairs and parents with strollers. Any walking event is \$2 for children and \$3 for teens and adults. Anyone can register at the event or they can pre-register at:

[http://redstonewanderers.20m.com/Pages/registration\\_form.htm](http://redstonewanderers.20m.com/Pages/registration_form.htm)



Photo by Dennis Olive, NASA/Marshall Space Flight Center

### **Pollution Prevention Award**

Dan Adams, left, project manager for pollution prevention at the Marshall Center, receives the Pollution Prevention Award from Center Director Art Stephenson April 9. The Environmental Engineering Department and its subcontractor CH2M HILL reduced toxic and general chemical use at Marshall by 50 percent. With him, right, is Rebecca McCaleb, manager of the Environmental Engineering Department.

## **Sports**

### **Women's pro football**

Debbie Scrivner of Marshall's Space Transportation Directorate and Leeann Smith of The Boeing Company move into their second season as professional women's football players with the Alabama Renegades.

See your co-workers in action. The Renegades 2001 Season Schedule is as follows:

April 21 — Renegades vs. Pensacola Power, 1:05 p.m.  
 April 28 — \* Nashville Dream vs. Renegades, 1:05 p.m.  
 May 12 — Renegades vs. East Tennessee Venom, 1:05 p.m.  
 May 19 — \*East Tennessee Venom vs. Renegades, 1:05 p.m.  
 May 26 — \*Chattanooga Locomotion vs. Renegades, 1:05 p.m.  
 June 2 — Renegades vs. East Tennessee Venom, 1:05 p.m.  
 June 9 — Renegades vs. Nashville, 1:05 p.m.  
 June 23 — \*Pensacola Power vs. Renegades, 1:05 p.m.  
 \* Denotes Home Games. Games are played at Discovery Middle School on Hughes Road in Huntsville.

### **Golf**

Upcoming golf tournaments include a two-person best score tournament at 7 a.m. May 19 at Guntersville State Park. Entry deadline is May 11. A two-person best score tournament will be held at 8 a.m. June 16 at Chesley Oaks. Entry deadline is June 8. To register for a tournament, call Lee Foster at 544-1589, Joey Butler at 544-3808 or Robert Rutherford at 544-8117.

## **Marshall-sponsored robotics teams take on competition in Florida**

The three Marshall-sponsored teams in the For Inspiration and Recognition of Science and Technology (FIRST) Robotics National Competition traveled to EPCOT Center in Orlando, Fla., April 5-7.

There were more than 340 teams competing with over 15,000 people in attendance. The teams were divided into four divisions with Arab High School in Arab and Lee High School in Huntsville participating in the Archimedes Division and Lincoln County Tennessee High School in Fayetteville, Tenn., participating in the Newton division.

Arab was the only Marshall team to be picked to play in the elimination rounds and they finished as the finalist in the Archimedes Division. Arab was ranked No. 39 in their division and was chosen to play in the semi-finals, but was put out in the final round. They did receive a trophy for being a finalist in the Archimedes Division. Their highest score was 414.

Lee finished as the No. 44 team in the Archimedes Division, but was not chosen to play in the finals. Their highest score was 480. They did not receive an award this year.

Lincoln County finished No. 80 in the Newton Division and had a high score of 159. They received the "Rookie All Star Award."

"For a small community in a large state, this enthusiastic group exhibits all the qualities of an ideal FIRST team," said Vicki Smith of Marshall's Education Programs Office of the Lincoln County team. "Not only did they build a robot, but also they have built the foundation for a long and bright future with FIRST."

"This competition truly is inspiring to all who participate. The school teams and volunteers who participated in the program did an outstanding job this year," Smith said.

## Center Announcements

### Blood drive

The American Red Cross will hold a blood drive from 8 a.m.-1:30 p.m. Friday at the NASA Exchange, Bldg. 4752. All donors will receive a gift certificate for a medium, one topping Domino's pizza. If you are unable to attend this blood drive, you may go to the Madison County Chapter of the Red Cross at 1101 Washington St. Please be aware that all donors need to be healthy. Donors taking antibiotics will not be allowed to donate. The schedule for the blood drive is: A-B, 8 a.m.; C-F, 8:30 a.m.; G-H, 9 a.m.; I-L, 9:30 a.m.; M-O, 10 a.m.; P-S, 10:30 a.m.; and T-Z, 11 a.m. If you are unable to make your assigned appointment time, the Red Cross will be available until 1:30 p.m. and will assist you whenever you arrive.

### Blue Cross/Blue Shield

The federal representative from Blue Cross/Blue Shield will be at the Center from 8:30-10:30 a.m. April 25 in Bldg. 4200, room 306, to assist employees with claims and questions.

### Mentoring program

Eminent project managers Emery Reeves, Fred Wojtalik, Jerry Gliksman and Jean Olivier are available for consultation with Marshall's program and project managers on an as-requested basis. Schedules and biographies are available on the Web at: <http://smo.msfc.nasa.gov/smo/customer/training/mentors/> For appointments, call Ann Pigg at 544-0570.

### Information exchange

A jointly sponsored, government and industry supportability information exchange symposium will be held from 1 p.m. May 7 through noon May 11 at the Bob Jones Auditorium in the Sparkman Center Complex Bldg. 5304 on Redstone Arsenal. The symposium, sponsored by the U.S. Army Materiel Command Logistics Support Activity, is open to all

government and contractor employees. Cost is \$100. For more information, call Emerson McAfee at 955-0808.

### ASEM conference

The American Society for Engineering Management (ASEM) will hold its 2001 conference Oct. 11-13 at the Huntsville Marriott. Abstracts on research results, instructional issues, work in progress, research proposals, and case studies are solicited. Due dates and specifics are available on the conference Web site at:

<http://www.engineering-management.org> or <http://www.asem.com>  
For more information, call Pamela Takada at 544-3645.

### Clubs and Meetings

### Shuttle Buddies meet

The Shuttle Buddies will meet for breakfast at 9 a.m. April 23 at

Mullins Restaurant on Andrew Jackson Way. For more information, call Deemer Self at 881-7757 or Gail Wynn at 852-8189.

### MOO meets

The Management Operations Office (MOO) retirees will meet for breakfast/lunch at 10 a.m. on April 26 at the Cracker Barrel Restaurant in Madison. For more information, call 539-0042.

### Miscellaneous

### Panoply needs volunteers

Panoply celebrates its 20<sup>th</sup> anniversary April 27-29. Volunteers are needed for a variety of tasks. Volunteer shifts are generally 2-3 hours in length. For more information, visit the Web at: [www.panoply.org](http://www.panoply.org)  
To volunteer, call Jo Ann Henderson or Brenda Balch at 519-2787.



Courtesy photo

### Mule man

Terry "Mule Man" Thompson participates in activities at the Columbia, Tenn., Mule Day. Thompson is the owner of the Auto Service Center in Bldg. 4678.

## Employee Ads

## Miscellaneous

- ★ Sofa sleeper, \$125; Ladies shoes, new, \$15. 534-0939
- ★ Two Lazy Boy recliners, large and medium sizes, matching green, two years old. 881-5736
- ★ Epson Elite programmable typewriter, \$50; Toshiba fax machine, \$50. 883-2237
- ★ Cherry Queen Anne table, 12" leaf, \$145; Mills Pride cabinets, 54x14x20, \$20 each. 325-6000
- ★ Five piece white resin patio set w/umbrella and base, \$75. 533-5942
- ★ JON boat, 14', V bottom, 10HP outboard, trailer, camouflage paint, \$400. 882-0461
- ★ Sears solid state Kenmore microwave oven w/touch pad controls, \$40. 828-4817 after 5 p.m.
- ★ White wicker furniture w/pads, \$75; Carter go-cart, 6HP, 2-seater, roll-cage, \$600. 829-1054 after 5 p.m.
- ★ BBQ grill/smoker on custom trailer, 6', \$1,700 obo; Total station universal weight machine, \$1,250 obo. 828-9579
- ★ Living room set, 5-piece, \$95. 464-8933 after 5 p.m.
- ★ Snapper riding mower, 8HP, 28" cut, \$500; Garmin Emap Deluxe GPS, \$200. 461-6337
- ★ Yamaha Model 25 clarinet w/case, \$400. 837-9479
- ★ Smith-Corona personal word processor w/monitor, \$125 obo. 461-8369
- ★ Four Michelin 195/60R15 tires, about 1/2 of tread remaining, \$15 each. 230-6846
- ★ Original STS-1 KSC cancelled launch cover, \$20. 773-7730
- ★ Apple 6100/DOS computer system, printer, dual-monitor, extras, \$200 obo; PC/MAC portable optical-drive w/4GB RW disks, \$100 obo. 828-6213
- ★ Black entertainment center; Futon sofa, two 19" TVs; VCR; glass table, chairs; assorted dishes; washer/dryer. 859-3647
- ★ Yamaha drum set, includes all cymbals, stands, cases, \$1,000. 895-2959
- ★ White camper shell, fits Nissan or Toyota truck, \$75. 931-433-0815

- ★ Laptop computer, Cannon DX4/100, internal floppy, PCMCIA modem, external CD ROM, Windows 95 & Office 95, \$165. 837-0625
- ★ American racing, aluminum wheels, 8 lug, 17"x9", \$800. 881-3353
- ★ 1986 Glasstream bass boat, 115HP Mariner, 24V trolling motor, depth-finder, live-well, garage kept, \$2,995 obo. 759-3906
- ★ 1997 Sea-Doo GTI, 3-seater, trailer, \$4,700. 256-586-7797
- ★ Hinomoto tractor, compact diesel, 4WD, w/tiller and mower, \$3,200. 837-1405
- ★ Fender Stratocaster (Mex.); Peavey Bandit 112 amplifier, \$300 ea. or \$500 both. 518-9882

## Vehicles

- ★ 1982 XV920 Virago, new paint, new tires, runs great, \$1,100. 379-4755
- ★ 1993 Dodge Grand Caravan SE, one-owner, many new parts, service records available, \$4,995 obo. 895-9520
- ★ 1978 Ford Thunderbird, 90K miles, one-owner, \$1,500. 539-6247
- ★ 1980 Chevy Suburban, new engine, 4WD, tow package, \$3,500. 881-8565
- ★ 1995 Chevrolet Lumina mini-van, 120K miles, \$3,500. 722-9989
- ★ 1993 Ford F150, short bed, 300 cid, 6-cylinder, 5-speed, a/c, new tires, \$3,850 firm. 256-753-2278
- ★ 1986 Nissan Maxima SE, 3.0L V6, manual transmission, sun-roof, \$1,500 obo. 519-7627
- ★ 1996 Nissan Pathfinder LE, 69K miles, 2WD, green w/leather interior, automatic, \$14,000. 232-1940
- ★ 1989 Buick Park Avenue, low mileage, many power options, new air & brakes, \$3,400. 534-7791
- ★ Civic EX 98, white CD changer, moon-roof, \$10,500. 353-3229 after 5 p.m.
- ★ 1999 Chevy Tahoe, 18K miles, lady driven, pewter w/gray leather, no 3<sup>rd</sup> seat, \$25,500. 653-6603
- ★ 1992 Dodge Caravan, 144K miles, a/c, am/fm/cassette, cruise, power-locks, built-in child seats, \$3,800. 885-2484
- ★ 1999 Mustang GT, auto, RIO, red, 35<sup>th</sup>

Anniversary Edition, 2K miles, \$19,900. 883-6284

## Free

- ★ Forty tomato cages, last call. 881-6595

## Wanted

- ★ Two kittens, Persian/Persian mix. 828-9579
- ★ To trade: New dish 500 system w/receiver & dish for older computer with a 400-500 processor & motherboard with/without case. 682-5181

## Job Opportunity

**Reassignment Bulletin 01-007-KP, AST, Technical Management, GS-801-13,**  
Office of the Director. Closes April 30.

## Thanks Moonbuggy volunteers

***A hearty thanks to the more than 300 NASA/Marshall employees, contractors and family members who gave of their time and energy to make the 2001 Great Moonbuggy Race a big success. We couldn't have done it without you!***

***The Moonbuggy Committee***

# MARSHALL STAR

Vol. 41/No. 31

Marshall Space Flight Center, Alabama 35812  
(256) 544-0030  
<http://www1.msfc.nasa.gov>

The Marshall Star is published every Thursday by the Internal Relations and Communications Department at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Contributions should be submitted no later than Monday noon to the Marshall Internal Relations and Communications Department (CD40), Bldg. 4200, room 101. Submissions should be written legibly and include the originator's name. Send electronic mail submissions to: [intercom@msfc.nasa.gov](mailto:intercom@msfc.nasa.gov) The Marshall Star does not publish commercial advertising of any kind.

Manager of Internal Relations  
and Communications — Robert Champion  
Editor — Debra Valine

U.S. Government Printing Office 2001-633-095-20044

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